

SOME TAXA OF RED-FLOWERED HIBISCUS
ENDEMIC TO THE HAWAIIAN ISLANDS

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After receiving a specimen of a red hibiscus from Mr. Rene Sylva from the Island of Maui last October, we dusted off our manuscript concerning the genus Hibiscus and here publish our opinions regarding some of its red-flowered taxa. Unlike more conservative workers we, like Sister Margaret James Roe, exclude the genus Pari-ti Adans., from Hibiscus L., for reasons explained **elsewhere. With this in mind, we recognize four cohorts of Hibiscus as endemic to the Hawaiian Archipelago. Besides other more important features, these groups can be distinguished from afar by flower color. The yellow is represented by such a species as the mao-hau-hele or H. brackenridgei Gray, mostly of arid lowlands; the pink by the hualalele or H. youngianus Gaud., mostly of swampy lowlands exposed to salt ocean breezes; the white by such a species as the fragrant pa-ma-kani or H. arnottianus Gray; and the red, the most difficult and most numerously represented on Kauai, by such a species as the enigmatic kokio-ula or H. kokio Hillebr. These two last groups thrive at low and middle elevations often in rainforests and ledges or streambanks exposed alternately to sun and mist. The suspicion expressed that H. kokio might actually represent a white-flowered taxon we dismiss as absurd as the specific name kokio and the vernacular name kokio-ula clearly refer to its flower color.

A "red" published as a new endemic for the Islands is ***H. fauriei Lévl. This unhappy binomial as ****Rock indicated, can be ignored as a Hawaiian plant. Bought from Abbé Faurie with other specimens for the College of Hawaii herbarium and soon deposited on permanent loan at the Bishop Museum by Legislative fiat, this specimen proved to be the African native coral hibiscus H. schizopetalus (Mast.) Hook. f., grown in gardens in most tropical countries!

H. clayi Deg. & Deg., of Kauai, with its diminutive leaves, is a strong species easily recognized even when sterile. Hence we felt no qualms in publishing an *****illustrated description of it in 1959.

Another "red" is ***** H. kahili Forbes, known only from the mountains of southern Kauai. It was last collected by St. John in 1947. This species is distinct as **Roe has indicated on page 21.

*An employee of the State, and an expert in Hawaiiana, especially regarding the native plants of his island.

**Deg. & Greenw. Fl. Haw. 2/15/57; Roe, M.J., in Pac. Sci. 15(1): 4. 1963.

***Fedde Repert. 10:156-157. 1911.

****Rock, J.F., in College Haw. Publ. 2:48. 1913.

*****Deg., O., I. Fl. Haw. 3/20/59.

*****Forbes, C.N., in Occas. Pap. B.P. Bish. Mus. 5(1):4. 1912.

Besides the differences noted by Roe between H. newhousei Roe of northeast Kauai and H. saintjohnianus Roe of northwest Kauai, we wish to emphasize the difference in leaf shape and venation. The former bears leaves with a distinctly acuminate apex and, on the under side, more delicate ribs and venation; while the latter has them acuminate and, on the under side, a prominent midrib flanked on each side by a single prominent rib. Contrary to some locally expressed opinion of wishing to unite the taxa, we follow Sister Margaret James Roe's findings. We know both species from living specimens as well as herbarium ones: 1.) Degeners & D. Plucknett No. 28,210. Hibiscus newhousei Roe (2 trees 12 feet high, slender-twiggy; calyx swollen, pale green; stamens red; anther & pollen pale yellow; style branches pink; stigma brownish.) Molokai, Anahola, Kauai. Open weedy ledges near water intake. March 12, 1961. 2.) H. saintjohnianus Roe is represented by Degeners & H.F. Clay No. 34,106. Cultivated in Lyon Arboretum, Honolulu, Oahu. A species endemic to Kauai. July 12, 1963. Degeners' No. 34,105 collected by H. F. Clay. Cultivated in Foster Botanical Garden, Honolulu, Oahu. Originally collected by B.C. Stone along Napali Coast, Kauai, Dec. 28, 1964.

Dismissing as good species with moderately well known ranges H. schizopetalus (syn. H. fauriei), H. clayi, H. kahilii, H. newhousei and H. saintjohnianus, our opinion regarding the two binomials H. kokio Hillebr., ex Wawra nom. nud., (in Flora oder allgemeine botanische Zeitung, p. 174. 1873.) versus H. saintjohnianus Roe (in Pac. Sci. 15(1):18. 1961.) deserves explaining:

What is precisely the true H. kokio, designated the official flower of the Islands in 1923? How many varieties and forms occur? We have worked out some of the answers. The remainder may be gained by the possible finding of herbarium specimens lurking neglected in some foreign museum, living specimens in botanic gardens, further field work, and growing seeds or cuttings from wild plants native to various island regions under controlled conditions.

Hooker & Arnott in Bot. Beech. p. 79. 1832, mentioned the occurrence of Hibiscus Boryanus, native to the Island of Réunion and described by deCandolle, as occurring at Byron Bay, an obsolete name for Hilo Bay, Island of Hawaii. The present city of Hilo is about ten miles south of the village of *Hakalau.

*Though we have no proof, we suspect that Hooker & Arnott's "Byron Bay" taxon is the "Hakalau Red" of E.V. Wilcox and V.S. Holt described in their "Ornamental Hibiscus in Hawaii. Haw. Agr. Exper. Stat. Bull. 29:58. 12/1/13 as a "Large tree, dark brown bark, green on twigs. Leaves ovate or lanceolate, serrate, smooth, dark green, $3/4-2\frac{1}{4}$ in. wide, $1\frac{1}{2}-4\frac{1}{4}$ in long, petiole $1/8-1\frac{1}{2}$ in. Flower $2\frac{1}{2}$ in., wide, uniform scarlet throughout, filaments short, column 2 in., peduncle $1\frac{1}{2}$ in., bracts 6, very narrow, green. Not self seeding; used as male parent." Knowing the area, practically a single sugarcane field stretching along the lowlands for about forty miles, we doubt this has persisted in the wild state unless, very improbably, along one of the few narrow, weed strangled gulches traversing it. The "Hakalau Red" is the only red hibiscus the authors mention for the island.

As deCandolle's species bears a red flower, the red-flowered Hilo plant was evidently in error identified as the Reunion species. In 1854 Gray (Bot. U.S. Expl. Exped. 1:176.) described the novelty H. Arnottianus, basing his description on two distinct species: the red-flowered Hawaii plant and a white-flowered Oahu one. According to the 1961 Int. Code Bot. Nomencl. Art 64, "When the same new name is simultaneously published for more than one taxon, the first author who adopts it in one sense, rejecting the other, or provides another name for one of these taxa must be followed." Ignoring for a moment Wawra's reference to "Hibiscus Kokio Hillebrand mss.", we find that Hillebrand (Flora Haw. Islands, p. 48. 1888.) selected the name "H. Arnottianus, Gray" for the species with white petals and "H. Kokio, Hillebr.", for a species with red. Now that we have established that some red-flowered hibiscus is H. kokio, precisely which plant is it? Wawra in Flora, oder allgemeine botanische Zeitung, page 174 [not 173, please note], 1875, published "Hibiscus Kokio Hillebrand mss.", as a nom. nud., with the remark, "Aus Hillebrands Herbar; 2403. Kokio der Eingebornen [sic]; der etwas breitere Kelch und Kronröhre unterscheidet sie von H. Arnottianno, mit dem er sonst über einstimmt (?). Baumartige schöne Sträucher, sollen nach Hillebrand aus den Pali-bildenden Felsmauern von Waiawa (Kauai) vorkommen; auch kultivirt in seinem Garten." On page 48 of his Flora, Hillebrand under the heading "H. Kokio, Hillebr. in Flora 1873, p. 173.", in error for p. 174 gives an adequate but garbled description to establish the name and, on page 49 adds the range: "Oahu, Muwanu (Remy); Molokai; Halawa (Hbd.); Kauai Haena and Waimea? (Mrs. Sinclair). Very rare, and probably is the Hibiscus with red flowers from 'Byron's bay' referred to by Hook. & Arn. under H. Boryanus, l.s. - Nat. names: 'Pualoalo' and 'Kokio'. Wawra's specimens came from the writer's garden, where it has been in cultivation for many years." The description includes numerous taxa, not just one. According to Hillebrand's Flora, page VIII, "The conventional sign ! placed after a name denoting habitat signified that a specimen or specimens of the species described are to be found in the author's herbarium, which, according to a verbal wish expressed a few hours before his death, has been presented to the Royal Botanical Museum of Berlin*." This fact is worded a bit differently on page XCI. Though Wawra's article mentions the species as occurring in Waiawa, Kauai, Hillebrand does not repeat this region in his Flora but mentions "Haena and Waimea? (Mrs. Sinclair)" instead. An enigma is Mrs. Sinclair's plate 9 (Indig. Fl. Haw. Isl. 1885.) which Hillebrand cites under his H. kokio. This is a painting of a red-flowered hibiscus, identified by J.D. Hooker as "Hibiscus Arnottianus A. Gray forma" and coming from Kauai or perhaps Niihau. This painting is certainly not of our Molokai type plant though identified as H. kokio by St. John (Pac. Sci. 8:143. 1954.). Judging from our own reactions when dealing with novelties, we believe a botanist would describe a novelty he had not only discovered himself but was cultivating in his garden. Following this reasoning, we place the type locality for the true H. kokio s.s., as Halawa, Molokai. Remember, this is the only red native in Hillebrand's herbarium (as noted by his exclamation mark "!") and evidently the only kind cultivated in his Vineyard



PLATE I. Hibiscus saintjohnianus Roe; Kew specimen

Street, Honolulu, garden. Caum (Occasional Pap. B.P. Bish. Mus. 9. (5):7. 1930.) apparently never saw Wawra's article but simply copied Hillebrand's reference precisely, even to the wrong page number. Miss Roe on page 14, incidentally, gave another wrong Hillebrand-Wawra reference. Caum describes as new Hibiscus kokio var. pukoonis from "Molokai, bottom of Pukoo Valley, just inside the native forest - -" and considers, with some misgiving, the Oahu plant the species itself. He is wrong. His var. pukoonis fits precisely a fragment of Hillebrand's plant as being in his herbarium by an exclamation mark and now deposited under an "Ex Museo botanico Berlinensi" label in the Bishop Museum as a gift from Berlin to J.F. Rock. It is annotated in Rock's handwriting to be "Hibiscus Kokio Hbd. Cultivated in Hbd's garden." We have seen the sheet. That is why we consider var. pukoonis a synonym of the species itself; and we have drawn heavily upon Caum's careful description. The Oahu plant, surprisingly, has never been properly named botanically.

Furthermore, we omit Mrs. Sinclair's Kauai plant as the possible type for Hillebrand's H. kokio as Hillebrand himself in his Flora indicates his doubt about his species identification by printing a question mark.

To make doubly sure regarding our suspicions about the two binomials H. kokio and H. saintjohnianus, we wrote Kew for help. Through the kindness of Director Sir George Taylor, C.E. Hubbard wrote us under date of the 27th June, 1963: "Dear Dr. Degener, Following your letter of the 18th June, we have looked up the specimen of Hibiscus kokio Hillebrand that was originally sent by Mrs. Sinclair in 1885. A photograph of the specimen is being prepared and a copy will be sent to you when it is ready. On the sheet is a label bearing Hooker's original determination 'Hibiscus aff. arnottianus'. There is also the collectors brown paper label bearing the vernacular name Kokia-ula. The later determination of Hibiscus kokio Hillebr. is on a separate slip. This sheet has been compared with Mrs. Sinclair's illustration and there can be no doubt that the two are the same plant. The illustration is, in fact, a very good representation of the species. We shall be very pleased to have duplicates of this species in due course when you are able to send them to us. Yours sincerely, C.E. Hubbard for Sir George Taylor, Director." July 16 Mr. Hubbard wrote: "I enclose the photograph of the type sheet of Hibiscus kokio Hillebr. which was promised to you in my recent letter. The descriptions on the labels do not show clearly, but they have been transcribed on the back of the print." Our accompanying plate I is a reproduction of the copyrighted Kew photograph. On the reverse is the following note, mentioned above, written in pencil:

"Hibiscus kokio Hillebr.
Hibiscus aff. Arnottiana
Hawaii; Mrs. Sinclair
Comm 1/1885
Kokia-ula"



PLATE II. Hibiscus kokio var. pekeloi Deg. & Deg.
Deg. No. 18,222, Wailau, Molokai, 8/3/28.

Though Mr. Hubbard considers Mrs. Sinclair's sheet at Kew the type of H. kokio Hillebr., the photograph shows it to be H. saint-johnianus Roe. Even though collected almost a Century earlier, we follow Roe in considering St. John No. 25,989 the lectotype. Put in other words, it is as follows:

HIBISCUS SAINTJOHNIANUS Roe

Hibiscus arnottianus A. Gray forma sensu Sinclair, Indig. Fl. Haw. Isl. Pl. 9. 1885. (Represented by Sinclair plant and Kew photograph.)

Hibiscus kokio Hillebr. Fl. Haw. Isl. 48. 1888. (In part.)

Hibiscus saintjohnianus Roe in Pac. Sci. 15(1):18. 1961.

Type Locality: "Headland west of Hanakapiai, Napali Coast, Kauai. Altitude- 700 feet; on partly precipitous slope. December 22, 1956. H. St. John 25,989." Degener, H.W. Hansen & G. Cliff No. 24,008 was collected Sept. 23, 1955 along "Mualolo Trail, Kokee region, Kauai. Sonny shrubby talus above cliffs. (4 ft. bush; fl. slightly yellower than true Chinese red.)" This specimen has leaves somewhat acuminate and the margins more serrate than the type plant.

The above witches' brew, though retaining H. saintjohnianus, boils down to our considering Caum's trinomial H. kokio var. pukoonis superfluous as it is predated by H. kokio Hillebr., s.s. (see also Articles 69 & 70 of the Code), The Molokai plant, needing a trinomial shall be:

HIBISCUS KOKIO Hillebr. var. KOKIO

Hibiscus kokio Hillebr. Fl. Haw. Isl. 48. 1888. (As to Molokai plant only.)

Not Hibiscus kokio of most authors.

Hibiscus kokio var. pukoonis Caum in Occas. Pap. B.P. Bish. Mus. 9(5):7. 1930. (His plate 5, however, has flower legends reversed in error.)

Type Locality: "Molokai! Halawa (Hbd.)"; deposited in the Marie C. Neal Herbarium, Bishop Museum, Honolulu.)

A recently discovered novelty is:

HIBISCUS KOKIO var. PEKELOI Deg. & Deg., var. nov. A specie foliis minimis differt. Plate II.

The blades are 50-80 mm. long (not 100-120 mm. as in Caum's taxon), 22-45 mm. wide (not 55-65 mm.), acute to rarely acuminate (not more uniformly acuminate), sinuately crenate to very rarely serrulate (never serrulate); petioles 3-20 mm. long (not 30-40 mm.).



PLATE III. Hibiscus ula Deg. & Deg.
Degeners' No. 34,145 collected by
Rene Sylva, West Maui, 11/-/76.

Type Locality: Otto Degener No. 18,222. Wailau Valley, Molokai. Rainy, shrubby, coastal ledges. Aug. 3, 1928. Deposited in NY. Lest readers err, we wish to emphasize that this is a trivial taxon of the true H. kokio of Molokai and not of any "red" thus named in error on Kauai or elsewhere. The name commemorates Mr. Noah Pekelo, Jr., who collected the same variety about May 18, 1963. The original Pekelo (or "Peter" in English), according to our friend, bore a longer Hawaiian name before the advent of the Missionaries. (Distributed to NY, Bishop, Berlin, Kew, Leiden, Vienna, Smithsonian). His material came from a "Little gully at an elevation of 2,250 ft. at Kainalu, Molokai, back of 'puu Mano'." "About a dozen or so plants remaining - very long branches crawling about over ulehe and other plants similar to Ieie but not entwining."

Having equated the above names with plants to our satisfaction, we know of numerous native "red" taxa having existed or still existing in the Hawaiian Archipelago. We know this from publications, from herbarium specimens collected by ourselves and others, and from plants formerly and presently in cultivation. The two acre "Hibiscus Garden," established by the Government in 1955 at the corner of Monsarrat and Paki Avenues, Waikiki, Honolulu, was a potential source of tremendous help. Due to the contributions of horticulturists and botanists like ourselves, a large collection of native, exotic, and hybrid taxa between the two, were growing under controlled conditions. In fact, by 1957 the collection consisted of hundreds of hybrids donated by "The Hawaiian Hibiscus Society," and "about 20 endemic Hawaiian species (Haw. Holiday, 12/1/57)." These plantings of scientific value were, while botanists were concentrating on other genera, suddenly bulldozed without much prior warning and changed into a "Rose Garden," a garden pretty to be sure but quite useless scientifically and out of place in the subtropics. The loss of this garden is largely responsible for the following sketchy surmises regarding some scientifically nameless "reds" not mentioned above. Many of these appeared closely related to one another perhaps because of lack of plasticity; because of ready transport from one island to another by floating seed or capsule to mix emerging gene pools; or, more likely, because of having been transported dry-shod between areas that later became distinct islands due to fluctuations in sea level or due to land movements. Be that as it may, keen gardeners or horticulturists, and less often botanists, have early recognized among the "reds" many different taxa. In fact, Wilcox & Holt mention, beside the Ha-kalau red, the Haena red, Kawaihapai red, Kipu red, Molokai red, and Oahu red. Caum (ibid., p. 8) in addition mentions an Ahuimanu red and a Mokuleia red.

HIBISCUS ULA Deg. & Deg., sp. nov. Frutex. Lamina 4-11 cm. longa, 2-7 cm. lata, obovata vel ovata, margine sinuato-dentate; petiolo 2- 50 mm.; stipulis 0-5 mm. Pedunculo 1-3 cm.; bracteis 6-7, subulatis; 4-8 mm. Calyce 15 mm. longo, furcato 4-5; lobis acutis. Corolla (rubris?), 75 mm. longis. Columna staminarum 55 mm.; filamentum 8 mm. Ramuli stylosum 8 mm. T. III.

Scandent shrub. Leaves with thin glabrous, broadly obovate to ovate blades 4-11 cm. long, 2-7 cm. wide, sinuately dentate, acumin-

ate to acute or rarely obtuse at apex, rounded at base, on ferruginous scurfy 2-50 mm. long petioles; stipules obscure to (on vigorous shoots) 5 mm. long, setaceous, pubescent. Peduncles near end of branches, 1-3 cm. long, articulate 1/4 from top, glabrate. Involucral bracts 6-7, subulate, 4-8 mm. long, glabrate. Calyx tubular, 15 mm. long, silky puberulent, cleft for 1/3 to 1/4 into acute triplinerved lobes of which lateral nerves in same flower may be fused at cleft or some mm. below it. Corolla red: tube about as long as calyx; lobes 4- to 6-nerved, narrow-obovate, 6 cm. long, toward top 3 cm. wide, glabrous except for faintly ciliolate margin. Staminal column 55 mm. long, glabrous, red, ending in five 1.5 mm. long teeth; filaments crowded toward distal fifth of column, about 8 mm. long, glabrous, antrorsely spreading; pollen yellow. Ovary 7 mm. long, 4 mm. wide, glabrous; style as long as staminal column, its red spreading glutinous hair (mostly with adhering pollen). Stigma and seed unknown.

Type Locality: "The plant is vine like and grows on a narrow ridge about an hour's walk from the Iao Valley State Park", West Maui." Collected by Rene Sylva (Degeners' No. 34,145). Type: NY; isotypes: Amherst, Berlin, Edinburgh, Geneva, Ithaca, Kew, Leiden, Leningrad, St. L., Wien.

Degeners & Fleming No. 25,125, "(15 ft. high, red flowered, twiggy shrub.) Honokowai ditch trail, W. Maui. Dark gulch-bottom near stream. March 27, 1959.", collected without flowers was a confusing plant until examination of Mr. Sylva's recent find. His No. 34,145 bears a few apparently depauperate leaves which are smaller, oval and with an obtuse apex, thus resembling those of No. 25,125. This latter plant is not thriving as its densely crowded nodes indicate. Conversely, a few of its watersprouts and a flowering specimen (Degeners No. 27,807) "Cultivated [by Colin Potter] in Foster Botanical Garden, Honolulu from cutting No. 25,125 (which see) from West Maui. Nov. 3, 1961.", matches the normal growth of No. 34,145. We conclude Nos. 25,125, 27,807 and 34,145 to be H. ula.

HIBISCUS OAHUENSIS Deg. & Deg., sp. nov. Frutex foliis saepe glabratiss. Petiolus 6-18 mm. longis; lamina chartacea, 5-13 cm. longa, 2-6 cm. lata, ovata; basi obtusa vel truncata; apice acuta rare acuminata; margine crenata vel raro subintegra. Pedunculus 25-30 mm. longus, bracteolae circa 7, puberulentae, 5-10 mm. longae. Calyx 25 mm. longus, 12 mm. latus, lobis acuminatis. Corolla 6-7 mm. longa, rubra. Columna staminarum 55 mm. longa.

Hibiscus kokio Roe in Pac. Sci. 15(1):14, 17 as to Oahu plant only; Figs. 9, 10. 1961.

Not Hibiscus kokio Hillebr. Fl. Haw. Isl. 48. 1888. (Unless it is the plant collected by Remy in "Nuuanu," Island of Oahu, sometime between 1851-55 and unknown to us.)

Straggling shrub with virgate branches up to 6 meters long, yellow-pubescent when young. Leaves: Petioles 6-18 mm. long, yellowish pubescent; blades ovate, 5-13 cm. long, 2-6 cm. wide, chartaceous, above glabrous to especially glabrate when young on ribs below, broadly obtuse to subtruncate at base, acute to rarely acuminate above, crenate except for lower fourth which is entire or nearly so or blade rarely subentire throughout; stipules linear, 2-6 mm. long, often caducous. Peduncle 25-30 mm. long, yellowish-pubescent; involucre bracts about 7, subulate, 5-10 mm. long, puberulent. Calyx glabrous, 12 mm. wide, 25 mm. long and split 2/5 its length into acuminate lobes. Corolla 6-7 cm. long, red, with spreading-reflexed 3 cm. wide petals. Staminal column pinkish, 55 mm. long, with flattened linear acuminate 4-5 mm. long reflexed teeth at top, with its 11 mm. long glabrous branches spreading from upper fifth of column. Style slightly longer than staminal column, with red spreading branches coarsely pubescent; stigma subcapitate, dark red.

Type Locality: "Kawaiiki Ditch Trail, Kawaiiloa, Koolau Range, altitude 1080 feet, November 23, 1956, Roe 204."

Local Range: Reliably known only from the type locality at about 400 meters elevation where a small colony existed. A venerable shrub with straggling branches up to 6 meters long has attracted the attention of several generations of hikers, hibiscus hybridizers and botanists. The kane writer, with Bush & Topping, collected material over thirty years ago from this individual shrub. A visit to this same plant in 1963 to gather Deg. & Deg. No. 28,245 for distribution to a few larger museums showed practically no change in appearance. The label reads: "On perpendicular, rocky bank at Kawaiiki Ditch intake, Kawaiiloa, Oahu, June 30, 1963." How this taxon relates to other plants on this and remaining islands, we do not presently know. Though it resembles H. kokio Hillebr., of Molokai, it differs in too many features like leaf shape and size of floral parts to be conspecific with it.

HIBISCUS ROEATA St. John in Pac. Sci. 26(3):286. 1972.

This taxon was discovered on "Kauai Island, Waimea Dist., bottom of short Nualolo Trail, 2,250 ft alt, 30 September 1969, Robert W. Hobby 158 (Bish)." According to Dr. St. John's description the flower is "(apparently red.)" Furthermore, according to a letter from Forester Hobby dated Dec. 15, 1971 "The Hibiscus (#158) you asked about are quite variable. - - - The flowers show much variety ranging from pale yellow-orange to red. The leaves also show variation in shape and pubescence. I suspect that there is hybridization occurring between the H. St.-johnianus and a maroon Hibiscus described to me by Hans Hansen. I could not find the maroon plants in three trips into the area, but there does seem to be hybridization. What do you make of it?"

The present prodromus should alert our young colleagues to continuous field work, hunting botanical and cottage gardens for native species that may have escaped the vandalized "Hibiscus Garden," and delving through libraries and herbaria throughout the World for neglected references and sheets of historical importance. Much remains to be done to gain a better knowledge of the red-flowered hibiscus endemic to the Hawaiian Islands.

This study is an example of the fuzzy state of knowledge pertaining to our native genera. In fact, most of them, every bit as interesting but not with conspicuous flowers universally admired, are still less known. So modern man is exterminating such fascinating creations faster than a botanist can list them in a Red Book as being rare and endangered. How can botanists stay the bulldozer from crushing an endemic jungle with unique plants and the animals that depend on them for food and shelter when no biologist has had the time to collect and study its unique biota (Phytologia 34(1):28-32. 1976.). Unfortunately by the Red Book method, the rarest plants have no protection at all as, being unknown, they miss the list! For most isolated and little known island systems, like the Hawaiian, all native species should be considered rare and endangered except a few. These last, like some treeferns, acacia and ohia-lehua, should be listed in a Blue Book of species available for harvesting, for replacement with a sterile golf course, or for judicious population control.

"Man is endowed with intellect and creative powers so that he may multiply what is given him, but up to now he has not created, he has destroyed. Forests are fewer and fewer, rivers dry up, game becomes extinct, the climate is ruined, and every day of the earth get poorer and uglier." Chekhov, "Uncle Vanya", 1899.